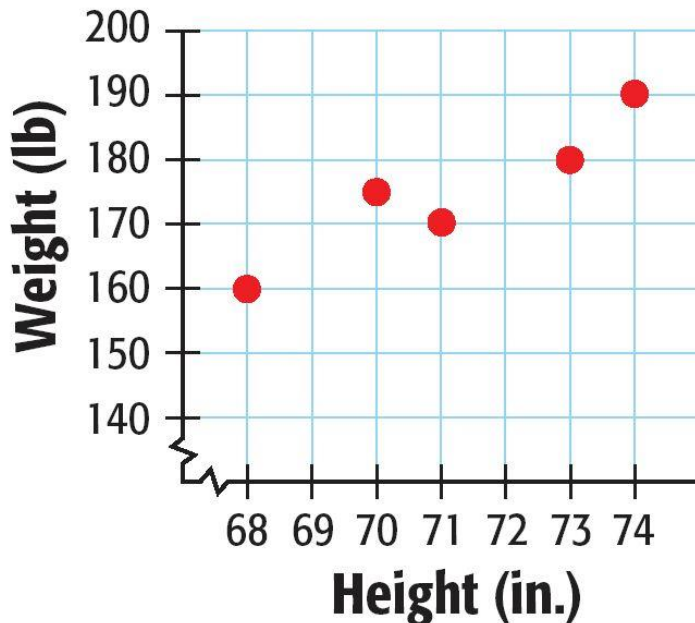# SCATTER PLOTS AND LINES OF BEST FIT

12.5

An effective way to see a relationship in between two sets of data is to display the information as a scatter plot.

The two sets of data are graphed as ordered pairs in a coordinate plane.

Scatter plots provide a convenient way to determine whether a correlation exists between two variables.
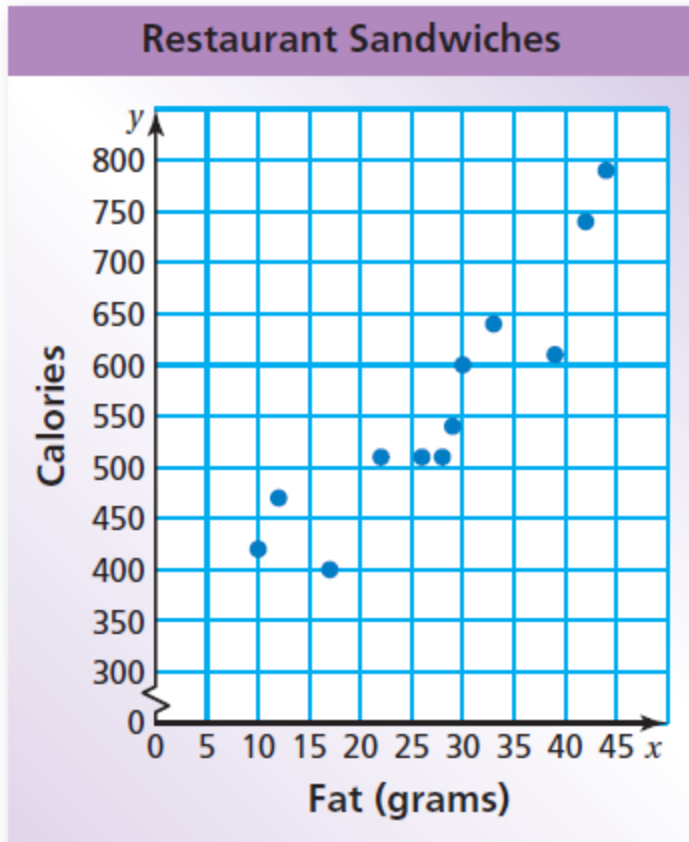

The points on the scatter plot are (68, 160), (70, 175), (71, 170), (73, 180), and (74, 190).

As one grows in height, one's weight increases.

EXAMPLE 1 **Interpreting a Scatter Plot**

The scatter plot at the left shows the amounts of fat (in grams) and the numbers of calories in 12 restaurant sandwiches.

Restaurant Sandwiches

Calories

Fat (grams)

a. How many calories are in the sandwich that contains 17 grams of fat?

    400 calories

b. How many grams of fat are in the sandwich that contains 600 calories?

    30 grams of fat

c. What tends to happen to the number of calories as the number of grams of fat increases?

   The calories tend to increase as the grams of fat increase

1. **WHAT IF?** A sandwich has 650 calories. Based on the scatter plot in Example 1, how many grams of fat would you expect the sandwich to have? Explain your reasoning.

Restaurant Sandwiches
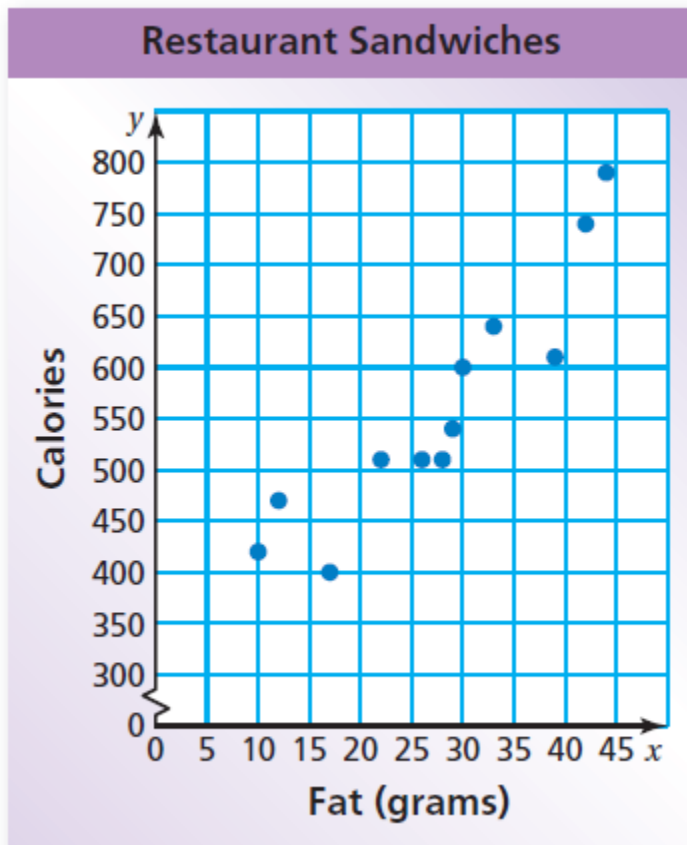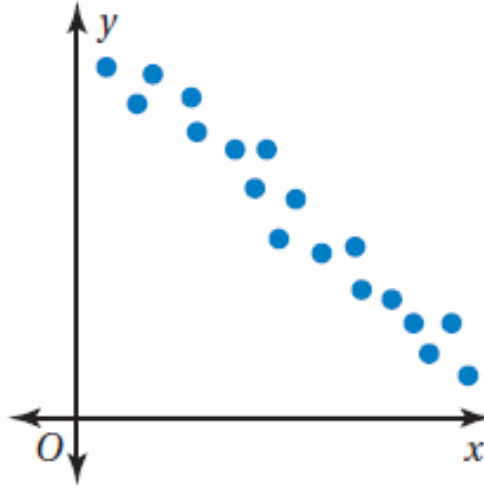

about 35 g; The point just below $y = 650$ has an x-value just below $x = 35$.

A scatter plot can show that a relationship exists between two data sets.
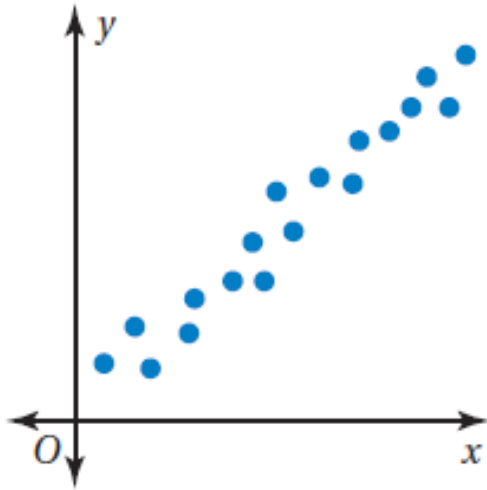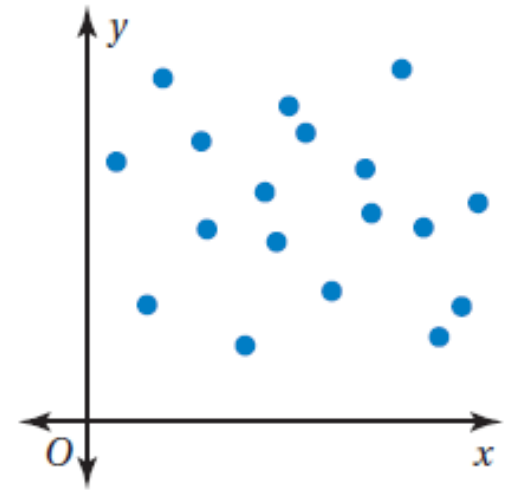
Positive Relationship   **Negative Relationship**   **No Relationship**

As x increases,   As x increases,   The points show
y increases. y decreases.   no pattern.
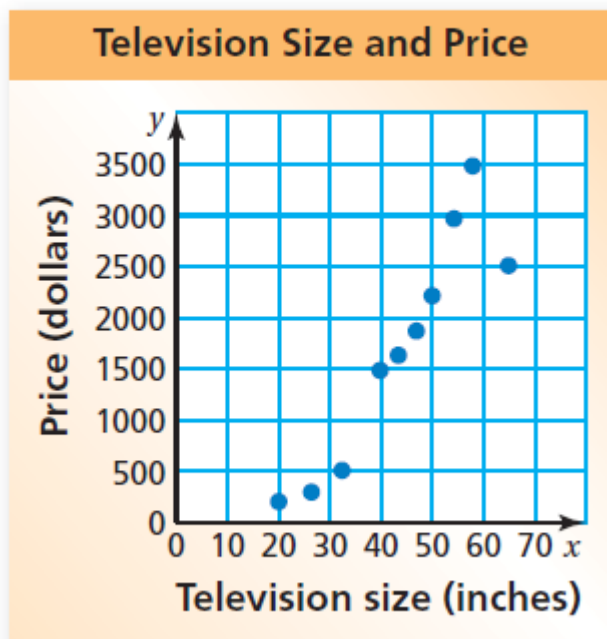
Scatter plots can also show unusual features of a data set, such as outliers, or gaps and clusters in the data.

EXAMPLE 2 Identifying a Relationship

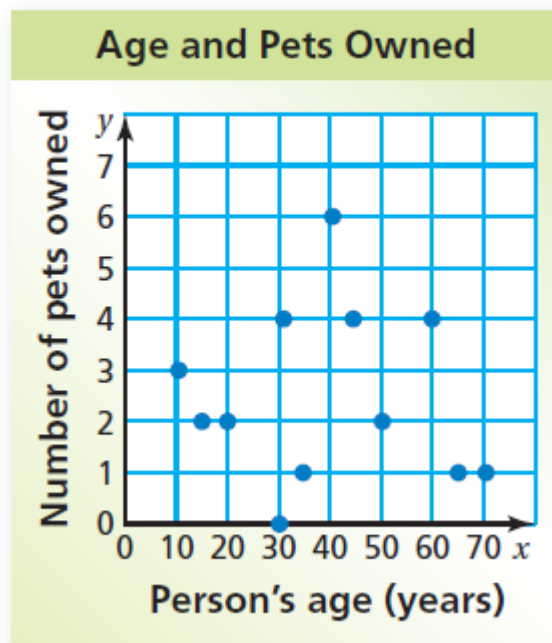**Tell whether the data show a *positive*, a *negative*, or *no* relationship.**

a. Television size and price

b. Age and number of pets owned

Television Size and Price

Age and Pets Owned

As the size of the television increases, the price increases.

Positive Relationship

The number of pets owned does not depend on a person's age.
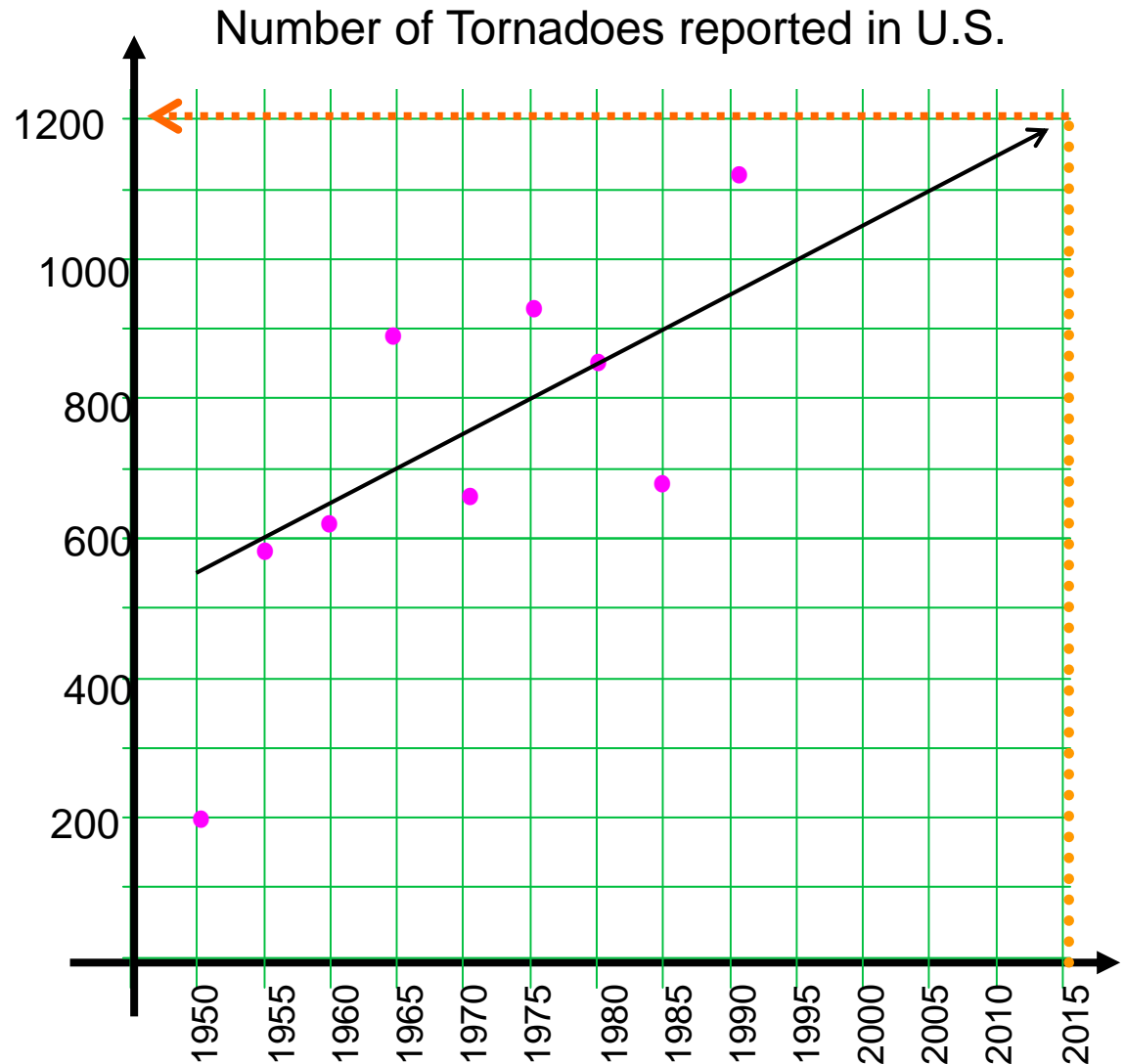
No Relationship

A **line of fit** is a line drawn on a scatter plot close to most of the data points. It can be used to estimate data on a graph.
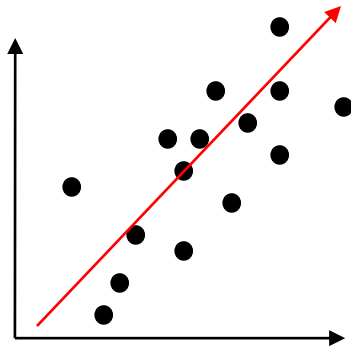
a. Interpret the slope.

Slope is 10. It means there is an increase of 10 tornadoes each year.

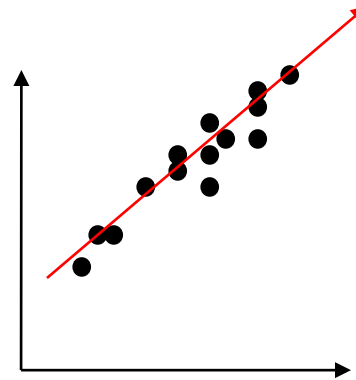b. Predict the number of tornadoes that occurred in 2015.

1200 tornadoes likely occurred in 2015.

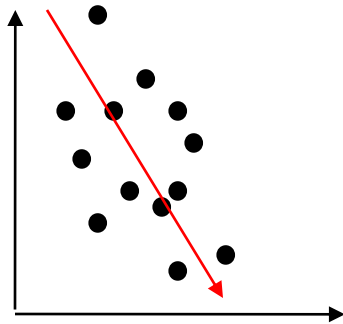Number of Tornadoes reported in U.S.

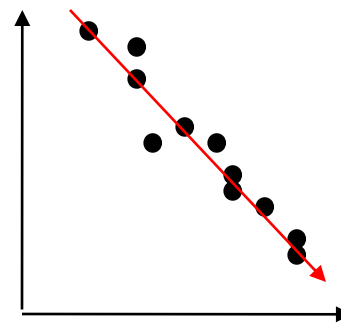If the data points are close to the line of best fit, it is said to have a <u>strong</u> correlation.

weak positive

strong positive

weak negative

strong negative

The table shows the numbers of people who have attended
a neighborhood festival over an 8-year period.

| Year, x	1	2	3	4	5	6	7	8
Attendance, y	420	500	650	900	1100	1500	1750	2400

a. Make a scatter plot of the data and draw a line of fit.

b. Write an equation of the line of fit.

c. Interpret the slope of the line of fit.

d. Predict the number of people who will attend the festival in
year 10.

On Your Own

The table shows the numbers of people who have attended a neighborhood festival over an 8-year period.

Year, x	1	2	3	4	5	6	7	8
Attendance, y	420	500	650	900	1100	1500	1750	2400

a.
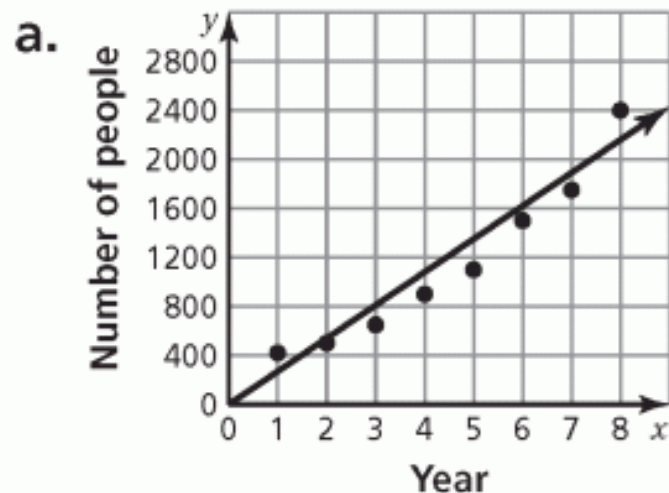
c. *Sample answer:* The slope of the line of fit is 270. This means the number of people attending is increasing by about 270 people each year.

b. *Sample answer:*
$$y = 270x$$

d. *Sample answer:*
about 2700 people